

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A vertical semiconductor device structure, comprising:

a substrate defining a substantially horizontal plane;

a gate electrode projecting vertically from said substrate and including a vertical sidewall;

a semiconducting nanotube extending between opposite first and second ends with a substantially vertical orientation;

a spacer of a dielectric material flanking said vertical sidewall and spaced horizontally from said vertical sidewall of said gate electrode to define a vertical passage having horizontal dimensions appropriate for the synthesis of said semiconducting nanotube, said semiconducting nanotube positioned in said vertical passage, and said spacer extending vertically relative to said gate electrode such that said vertical passage a vertical dimension greater than or equal to a vertical height of said vertical sidewall of said gate electrode;

~~a semiconducting nanotube positioned in said vertical passage and extending between opposite first and second ends with a substantially vertical orientation;~~

a gate dielectric disposed on said vertical sidewall between said semiconducting nanotube and said gate electrode;

a source electrically coupled with said first end of said semiconducting nanotube; and

a drain electrically coupled with said second end of said semiconducting nanotube.

2. (Original) The semiconductor device structure of claim 1 wherein said source is composed of a catalyst material effective for synthesizing said semiconducting nanotube by a chemical vapor deposition process.

3. (Original) The semiconductor device structure of claim 1 wherein said drain comprises a catalyst material effective for synthesizing said semiconducting nanotube by a chemical vapor deposition process.

4. (Original) The semiconductor device structure of claim 1 wherein said spacer is separated from said substrate by a gap, said gap being filled by an insulating material after said semiconducting nanotube is formed.

5. (Original) The semiconducting device structure of claim 1 wherein said semiconducting nanotube is composed of arranged carbon atoms.

6-7. (Cancelled)

8. (Currently Amended) The semiconducting device structure of claim 1 wherein said vertical passage has a rectangular cross-sectional profile when viewed in a vertical direction.

9. (Currently Amended) The semiconducting device structure of claim 1 wherein said source is composed of a catalyst material effective for synthesizing said semiconducting nanotube by a chemical vapor deposition process, said source positioned on said substrate in vertical alignment with said vertical passage.

10. (Currently Amended) The semiconducting device structure of claim 9 wherein said spacer is vertically spaced relative to said substrate to define a gap ~~effective for~~ communicating with said passage, said gap and said vertical passage collectively providing a pathway for a reactant to said catalyst material of said source ~~effective to grow~~ for growing said semiconducting nanotube by a chemical vapor deposition process.

11. (Currently Amended) The semiconducting device structure of claim 10 further comprising:
an insulating material filling said gap, said insulating material placed in said gap after said semiconducting nanotube is grown by [[a]] the chemical vapor deposition process.

12. (Currently Amended) The semiconducting device structure of claim 1 further comprising:
a plurality of semiconducting nanotubes positioned horizontally between said gate electrode and said spacer, each of said plurality of semiconducting nanotubes extending vertically in said vertical passage between opposite first and second ends.

13. (Currently Amended) The semiconducting device structure of claim 12 further comprising:
an insulating material filling space within said vertical passage not occupied by said plurality of semiconducting nanotubes.

14. (Original) The semiconducting device structure of claim 1 further comprising:
a plurality of semiconducting nanotubes positioned horizontally between said gate electrode and said spacer, each of said plurality of semiconducting nanotubes extending vertically between opposite first and second ends.

15. (Original) The semiconducting device structure of claim 14 wherein at least one of said plurality of semiconducting nanotubes has said first end electrically coupled with said source and said second end electrically coupled with said drain.

16-41. (Cancelled)

42. (Previously Presented) A semiconductor device structure, comprising:

- a substrate;
- a gate electrode projecting from said substrate and including a sidewall;
- a first spacer of a dielectric material flanking said sidewall to define a passage;
- a semiconducting nanotube positioned in said passage between said sidewall and said spacer and extending between opposite first and second ends;
- a gate dielectric disposed on said sidewall between said semiconducting nanotube and said gate electrode;
- a source electrically coupled with said first end of said semiconducting nanotube; and
- a drain electrically coupled with said second end of said semiconducting nanotube, said gate electrode being positioned between said drain and said source.

43. (Currently Amended) The semiconductor device structure of claim 42 wherein said spacer is separated from said substrate by a gap and said ~~spacer is separated from said sidewall by a~~ passage ~~communicating~~ communicates with said gap, ~~said semiconducting nanotube being positioned in said passage,~~ and further comprising:

- an insulating material filling said gap and portions of said passage unfilled by said semiconducting nanotube.

44. (Previously Presented) The semiconductor device structure of claim 42 wherein said spacer is separated from said substrate by a gap, and further comprising:

- an insulating material filling said gap.

45. (Currently Amended) The semiconductor device structure of claim 42 ~~wherein said spacer is separated from said sidewall by a passage, said semiconducting nanotube being positioned in said passage, and~~ further comprising:

an insulating material filling portions of said passage unfilled by said semiconducting nanotube.

46. (New) The semiconductor device structure of claim 42 wherein said source is composed of a catalyst material effective for synthesizing said semiconducting nanotube by a chemical vapor deposition process.

47. (New) A semiconductor device structure fabricated on a substrate, the semiconductor device structure comprising:

a gate electrode projecting from the substrate and including a sidewall;

a first spacer of a dielectric material flanking said sidewall of said gate electrode to define a passage;

a semiconducting nanotube positioned in said passage between said sidewall of said gate electrode and said spacer, said semiconducting nanotube extending between opposite first and second ends;

a gate dielectric disposed on said sidewall of said gate electrode between said semiconducting nanotube and said gate electrode;

a source electrically coupled with said first end of said semiconducting nanotube; and

a drain electrically coupled with said second end of said semiconducting nanotube, said gate electrode being positioned between said drain and said source, and said semiconducting nanotube having a length such that said second end of said semiconducting nanotube projects beyond said gate electrode and into said drain.

48. (New) The semiconductor device structure of claim 47 wherein said source is composed of a catalyst material effective for synthesizing said semiconducting nanotube by a chemical vapor deposition process.

49. (New) The semiconductor device structure of claim 47 wherein said spacer is separated from the substrate by a gap communicating with said passage.

50. (New) The semiconductor device structure of claim 49 further comprising:
an insulating material filling said gap.

51. (New) The semiconductor device structure of claim 49 further comprising:
an insulating material filling said gap and portions of said passage unfilled by said semiconducting nanotube.

52. (New) The semiconductor device structure of claim 47 further comprising:
an insulating material filling portions of said passage unfilled by said semiconducting nanotube.